NEW SPECIES OF SOUTH DAKOTA CRETACEOUS CRABS.

By Mary J. Rathbun,

Associate in Zoology, United States National Museum.

The fossil crabs described below were sent to the United States National Museum for identification by Mr. W. H. Over, of the University of South Dakota, Vermilion, South Dakota. They were collected by Mr. Over in the Pierre Shales, partly at Indian Creek, Pennington County, in the summer of 1914, but chiefly at Eastern, Corson County, in the summer of 1915.

The most numerous form represents a new type of Dromiacean for which it is necessary to construct a new superfamily. The two remaining species are referred to known genera.

The type-specimens have been given to the United States National Museum, while duplicates are in the collection of the University of South Dakota.

Tribe BRACHYURA.

Subtribe DROMIACEA.

In this subtribe the oviducts perforate the coxae of the second pair of ambulatory legs, while the seminal ducts perforate the coxae of the last pair of legs. The last pair of legs are dorsal in position and nearly always prehensile, slender, and reduced in size.

DAKOTICANCROIDEAE, new superfamily.

Sternum of female without longitudinal grooves. Eyes sheltered by orbits when retracted. No *lineae anomuricae.*

This superfamily is made necessary, because the species here described can not be placed in the Dromioideae, in which the sternum of the female has longitudinal grooves, nor in the Homoloideae, in which the eyes are incompletely or not at all sheltered by orbits, and *lineae anomuricae* are nearly always present.

DAKOTICANCRIDAE, new family.

Same characters as those of the superfamily.

DAKOTICANCER, new genus.

Carapace transverse, thick, deeply grooved. Front, between the eyes, small. Orbits well defined; eyes small, tapering. Outer max-

illipeds broad and flat, but advanced beyond the front. Chelipeds elongate, merus large, palm small, fingers [1] very long. Last leg very small, subdorsal.

DAKOTICANCER OVERANA, new species.

Plate 32; plate 33, figs. 6–14.

Type-locality.—South Dakota: Indian Creek, Pennington County; Pierre Shale; Upper Cretaceous; August, 1914; W. H. Over; two specimens, holotype and paratype, presented by the University of South Dakota, Vermilion, South Dakota.

Holotype.—Cat. No. 32055, U.S.N.M.

Additional material.—More than 80 specimens were collected at Eastern, Corson County, South Dakota, in the Pierre Shales, by W. H. Over, July, 1915. Most of these are in the University of South Dakota, but a series of 30 have been presented to the United States National Museum.

Measurements.—Holotype, width of carapace, 30.2; approximate length, 26; approximate thickness, 10; width between the outer angles of the orbits, 15.4 mm.

Description.—There is no complete specimen even of the carapace, so that this description is a composite from a number of specimens. Carapace thick, transversely suboblong; gastro-cardiac area separated by a deep and angled groove from the branchial and hepatic regions, which are deeply separated from each other; a broad, deep, transverse branchial groove is continued forward on the nearly vertical side-wall of the carapace toward the buccal angles; a broad, shallower groove furrows the side-wall just below the hepatic region; a depression follows the posterior and lateral margins of the carapace just within the edge. The most elevated portions are covered with small granules; the intermediate areas, comprising the greater part of the surface, are smooth and finely punctate; the longitudinal, granulated band on the gastro-cardiac is not interrupted by the narrow, shallow groove which separates those two regions from each other. The inner angle of the branchial region is prolonged backward and inward in a narrow, raised peninsula, nearly surrounded by deep impressions and pits. The anterior part of the carapace is divided by shallow depressions into longitudinal areoles, four on either side of the middle, of which two are gastric and two hepatic. Posterior margin granulate and slightly arched, meeting the side margin at a rounded angle.

[1] The character of the fingers is given with a reservation. Of the many specimens taken, only one shows a trace of fingers, and these exhibit such an unusual shape that although they are in the position where one expects fingers, *i. e.*, bent against the arm, it may later be proven that they are, for example, merus joints of ambulatory legs. On the other hand, the fragility resulting from their great length and relative slenderness may account for the destruction of all the fingers which this large collection of crabs possessed.

Front deflexed, subtriangular, broader than long, bilobed at extremity, medially grooved, sides elevated, granulate.

Orbits inclined forward and outward and, in front view, downward; divided into two sockets, the inner one the larger, and with a spine on its lower border. Eyes reaching very little into the second socket and tapering distally.

One joint of the antennule is seen just below the origin of the eye and has granulated edges.

Outer maxillipeds only partially shown. Exognath half as wide as endognath, of which only the ischium is visible and that has the end broken off. Even so, it reaches forward beyond the line of the rostrum. There appears to be a space between the two maxillipeds. Their edges are finely granulated.

Chelipeds over twice as long as carapace. Merus massive, a little compressed, widest at the middle, granules in several rows on the margins, scarce elsewhere. Carpus slightly longer than wide, outer or upper surface granulate, with a longitudinal groove through its middle, inner margin spinulose. Palm nearly as high as its superior length, granules arranged irregularly in wide lengthwise bands, and more spinulose than elsewhere. Fingers elongate, two or three times as long as palm, compressed, granulate about the edges. The fingers themselves are not preserved, but only their impression.

Only the proximal portions of the ambulatory legs can be made out. First three pairs similar and of good size; the ischium and merus joints are granulate, and the latter are compressed. The last pair are slender and much reduced in length and are probably subdorsal; very little of them remains except the first segment.

Most of the specimens showing the ventral surface are males, but five are females. The genital ducts are to be seen at the base of the fifth pereiopods in the male, of the third in the female. The sternal segments are granulate through the middle; the first segment bears a transverse depression. The abdomen is composed of seven separate segments in both sexes; in the male it is oblong with the sides somewhat convergent, in the female it is subovate.

Relationships.—This form approaches *Polycnemidium pustulosum* Reuss from the Cretaceous of Bohemia,[1] in the areolation of the carapace and the extent of the fronto-orbital region, but the latter has the carapace more strongly convergent posteriorly and nothing is known of its appendages.

[1] Denk. k. Akad. Wiss., math.-natur. Cl., vol. 17, 1859, p. 6, pl. 3, fig. 1.

Superfamily HOMOLOIDEAE.

Family HOMOLIDAE.

Genus HOMOLOPSIS (Carter, MS.) Bell.

Homolopsis Bell, Mono. Foss. Malac. Crust. Gr. Britain, pt. 2, 1862, p. 22.

HOMOLOPSIS PUNCTATA, new species.

Plate 33, figs. 1–3.

Type-locality.—South Dakota: Eastern, Corson County; Pierre Shale; Upper Cretaceous; July, 1915; W. H. Over; one specimen, holotype, presented by the University of South Dakota, Vermilion, South Dakota.

Holotype.—Cat. No. 32058, U.S.N.M.

Measurements.—Length of carapace of holotype, 19; width (estimated), 25 mm.

Description of holotype.—Carapace only, with a longitudinal break on each side across the entire length. The posterior two-thirds is fairly level except toward the side margins, but the anterior third curves strongly downward. The grooves separating the gastric and cardiac regions from the branchial region, and the epibranchial from the mesobranchial lobe, and those limiting the hepatic region are very deep. Much shallower grooves limit the mesogastric and urogastric regions, and the mesobranchial lobe posteriorly. The surface of the carapace is finely and uniformly punctate except on the elevated portions, which are roughened with fine uneven granules, many of which on the posterior part of the carapace are combined in short transverse lines. The elevations form, in the main, regularly placed bosses or areoles well separated; four of these bosses are on the mesogastric region, two being median and two transverse and side by side at the widest part; there is one boss on each epigastric lobe, and three large and one small on each protogastric lobe; two large and one small boss on each epibranchial lobe. The cardiac region has one large flat elevation, subtriangular, widest in front. The mass of granules on the mesobranchial lobe is transversely oblique, following the shape of the lobe. On the metabranchial lobes the granules are more scattered and less elevated than elsewhere.

The front between the eyes is equilaterally triangular, strongly bent down, surface concave, tip apparently blunt. There are two tubercles or spines (broken off) on the upper border of the orbit, besides one at the outer angle.

On the lateral margin there is a small spine not far from the orbit, a large spine and two or three small ones on the hepatic region, and two (one below the other) on the epibranchial lobe.

Posterior margin bordered by a thin raised granulated rim.

Relationships.—This species has considerable resemblance to *H. edwardsii*[1] Bell, the type-species of the genus, but in the latter, the protogastric lobes are each partially separated from the metagastric lobes by a deep, transversely oblique furrow, the cardiac region bears a small tubercle at its middle, the surface is everywhere granulated.

H. depressa Carter,[2] from the same localities as *edwardsii*, is also granulated throughout and lacks the large areolar tubercles of *punctata*.

Our species is near *H. transiens* Segerberg[3] from the Cretaceous of Denmark, which however, has no large mesogastric tubercles, and has three instead of four tubercles on each protogastric lobe.

H. richardsoni Woodward,[4] from the Cretaceous of British Columbia, and *H. japonica* Yokoyama,[5] from the early Tertiary of Japan, have a carapace much narrower anteriorly than those above mentioned. They should probably be referred to a distinct genus.

Subtribe OXYSTOMATA.

? Family CALAPPIDAE.

Genus CAMPYLOSTOMA Bell.

Campylostoma BELL, Mono. Foss. Malac. Crust. Gr. Britain, pt. 1, 1857, p. 23.

CAMPYLOSTOMA PIERRENSE, new species.

Plate 33, figs. 4–5.

Type-locality.—South Dakota: Eastern, Corson County; Pierre Shale; Upper Cretaceous; July, 1915; W. H. Over; two specimens, holotype and paratype, presented by the University of South Dakota, Vermilion, South Dakota.

Holotype.—Cat. No. 32057, U.S.N.M.

Description of holotype.—An incomplete carapace, showing dorsal surface and an indication of the extent of one orbit. The orbit has a somewhat dorsal inclination, is slightly acutangled externally and has a tooth on the upper margin. The outer surface of shell, where it persists, is finely granulate. Spines conical. Five spines in a transverse row on the gastric region, which arches upwards toward the middle; row not quite straight, but slightly concave forward; distance from the middle spine to those of the submedian pair less than from the latter to those of outer pair. A median ridge runs back to the hinder border of the cardiac region, and bears five spines,

[1] Mono. Foss. Malac. Crust. Gr. Britain, pt. 2, 1862, p. 23, pl. 5, figs. 1 and 2. From the Gault at Folkestone and the Greensand at Cambridge.

[2] Quart. Journ. Geol. Soc. London, vol. 54, 1898, p. 22, pl. 1, fig. 5.

[3] Geol. Fören. i Stockholm Förhandl., vol. 22, 1900, Häfte 5, p. 366, pl. 8, figs. 6–8. Also, Woodward, Geol. Mag., London, new ser., dec. 4, vol. 8, 1901, p. 499.

[4] Quart. Journ. Geol. Soc. London, vol. 52, 1896, p. 224, text-fig. 3.

[5] Journ. Coll. Sci. Imper. Univ. Tokyo, vol. 27, 1911, art. 20, p. 12, pl. 3, fig. 4.

viz, one mesogastric, besides the one above mentioned, one urogastric, two cardiac; the anterior of the gastric spines is the largest of all. On the inner branchial region there is a short, nearly longitudinal ridge, inclining a little inward anteriorly, and bearing a spine at each end, the posterior spine the larger; on the right side there is a small, low spine on the anterior slope of the posterior spine; this accessory spine is wanting on the left side. A short but high, oblique ridge runs to the postero-lateral margin, rises in a low spine anteriorly and terminates posteriorly in a strong spine which points backward and outward, but is broken off at base. Short, low, obliquely transverse ridges lead to two other lateral spines. All the lateral marginal spines are broken off close to their origin. They appear to be four in number, and with an hepatic and an outer orbital spine form an almost semicircular row of six spines. The pterygostomian region is produced well beyond the first of these spines and bears a spine which is a little in advance of the angle of the orbit.

Description of paratype.—Smaller than holotype, with all spines broken off, and with rostrum visible; this is small, triangular, surface concave, with a deep, longitudinal furrow, tip rounded.

Measurements.—Estimated width of carapace of holotype, at widest part, in front of middle, 28 mm. Width of paratype at same point, 18.6 mm.; approximate length of same, 20 mm.; width across front and orbits, 8.6 mm.

Relationships.—This species resembles *C. matutiforme* Bell,[1] the type-species of the genus, from the London Clay (Eocene) of the Isle of Sheppey, England, in the presence of spines or tubercles on the dorsal surface and spines on the margin. In *pierrense* the spines are more numerous (6 marginal instead of 5), the front is simple instead of bifid, and the pterygostomian region is much more prominent.

As the specimens in hand show none of the appendages, I am unable to improve upon the present grouping of this genus in the Matutinae. The obliquely vertical surface in front of and below a line drawn between the outer orbital spine and the pterygostomian or subhepatic spine, is suggestive of the concave suborbital surface in many species of *Hepatus*.[2] A prominent subhepatic spine exists often in the Oxyrhyncha, as in our common spider crabs, *Libinia*.[3]

[1] Mono. Foss. Malac. Crust. Gr. Britain, pt. 1, 1857, p. 23, pl. 3, figs. 8-10.

[2] Latreille, Hist. Nat. Crust., vol. 3, year 10 (1801-2), p. 22.

[3] See Proc. U. S. Nat. Mus., vol. 15, 1892, pl. 31, figs. 1, 2; the marginal spine behind the orbit is on a much lower level than the succeeding spines.

EXPLANATION OF PLATES.

(Figures enlarged nearly 1½ times.)

PLATE 32.

Dakoticancer overana.

FIG. 1. Holotype, male, ventral view.
2. Holotype, male, dorsal view.
3. Holotype, male, posterior view, showing bases of hind legs and genital ducts.
4. Paratype *b*, male, anterior view, showing eyes.
5. Paratype *a*, dorsal view, showing part of posterior margin of carapace.
6. Paratype *l*, ventral view, showing sternum of female.
7. Paratype *h*, dorsal view, to show outline of front.
8. Paratype *d*, ventral view, showing genital ducts of female.
9. Paratype *c*, ventral view, showing abdomen of female.
10. Paratype *e*, ventral view, showing abdomen of male.
11. Paratype *b*, ventral view, showing portion of maxillipeds.

PLATE 33.

FIGS. 1–3. *Homolopsis punctata*, holotype. 1. Anterior view. 2. Dorsal view. 3. Right side, in profile.
4–5. *Campylostoma pierrense*. 4. Holotype, dorsal view. 5. Paratype, dorsal view.
6–14. *Dakoticancer overana.*

FIG. 6. Paratype *f*, manus.
7. Paratype *f*, cheliped (merus, carpus, manus).
8. Paratype *h*, left side of carapace, in profile.
9. Paratype *d*, right side, in profile.
10. Paratype *c*, right side, in profile.
11. Paratype *g*, carpus of cheliped.
12. Paratype *g*, manus.
13. Paratype *k*, extremities of two ambulatory legs.
14. Paratype *j*, cheliped (merus and impressions of fingers).